Measurements on a number of the larger glaciers of the rate of movement were made. These showed the differential movement in various parts of the individual glaciers and indicated a much greater speed of movement in the summer. Not any variation of importance has been observed in the position of the lower end of the larger glaciers in recent years.

R. C. M.

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"Die Geomorphologie und Quartärgeologie des Sarekgebirges." By AXEL HAMBERG. *Geol. fören. förhandl.*, Bd. 32, Heft. 4, April, 1910. Pp. 25, map 1.

The Sarekgebirge (north Sweden) are made up of the following rocks:

4. Amphibolite (1,000–1,200 m.)
3. Syenite (350 m.)
2. Silurian beds (150 m.)
1. Basement complex

The topography shows a striking dependence on the structural relations and resistance of the rocks. As an example is cited the development of numerous falls where the easily eroded Silurian shales have been weathered from beneath the resistant syenite. The mountain massifs are mostly flat-topped, possibly indicating remnants of an old erosion surface. Large deep valleys have been cut in the amphibolite but not far into the syenite. This is doubtless due to the superior resistance of the latter, not to any interruption of a former drainage cycle.

The Sarekgebirge were almost certainly a center of ice dispersion in the early Pleistocene. The presence of erratics from some distance to the southeast indicates that the center of ice movement later changed in this direction. In the retreat of the ice there was apparently a time when the ice from the southeast was no longer able to move up the slope of the mountains, and lakes were formed between the valley walls and the edge of the ice. Shore-line phenomena, especially where the valley walls are less steep, mark the levels of these lakes, but because the outlet over the ice was continually and gradually lowered, the level of the lakes was inconstant, and instead of a few sharply defined beaches there are a large number of indistinct shore lines. Ice blocks left at certain places in the valleys seem to have determined in part the courses of certain

glacial streams which are independent of the present topography of the valleys.

Glaciers are now the most important erosive agents in the Sarekgebirge. Because of the altitude, frost, ice, and daily temperature range have developed extensive rock-fields, or on steep slopes, large talus piles. Deltas have, in a number of places, been built in the lakes by the heavily mud-laden streams from the glaciers. As an indication of the immense amount of post-glacial filling may be cited the extinction of one or more considerable lakes by this process.

R. C. M.

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*A Geologic Reconnaissance of a Part of the Rampart Quadrangle, Alaska.* By HENRY M. EAKIN. Bull. U.S. Geol. Surv. No. 535, 1913. Pp. 38.

This report takes into account the Rampart and Hot Springs district which include most of the triangular area between the Yukon and Tanana rivers west of longitude 150°, and a strip of territory on the north side of the Yukon that extends nearly to longitude 154°. The base of the geologic column is formed by a series of metamorphic rocks which consists of probable Silurian and Devonian limestones and schists, late Paleozoic greenstones (that contain some sedimentary beds), early Mesozoic slates, sandstones, and conglomerates, Cretaceous and older slates, quartzites, and schists. All of these beds are closely folded. The metamorphic series is overlain locally by Eocene beds which represent part of the notable fluviatile deposition of Eocene time, "evidence of which is widespread in Alaska." The strata are considerably folded and faulted. A good part of the region is mantled by Quaternary silt, sand, and gravel deposits. The silt is probably of glacial origin. The igneous rocks consist of probable late Paleozoic rhyolite flows, tuffs, and flow breccias, probably late Paleozoic basic flows, tuffs, diabase, glassy lavas, and tuffs, late Mesozoic or early Tertiary monzonite sills and batholiths with numerous dikes. Erosion occurred in post-early Mesozoic, post-Lower Cretaceous, post-Upper Cretaceous, and in post-Tertiary times. Placer gold is the only mineral of economic importance. The gold and silver production of the Rampart district is decreasing while that of the Hot Springs district is rapidly increasing. The largest output of the latter district was in 1911. The placer gold has been derived from quartz veins in the old metamorphic rocks, from carbonaceous beds, and from hematite deposits in the neighborhood of monzonite. The placers are of two types—those of present stream and those of terrace gravels. Pebbles of cassiterite occur with the gold in the Sullivan Creek placers but are not worked to any extent.

V. O. T.